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Gross Product by Industry, 1977-88: A Progress Report on Improving the Estimates

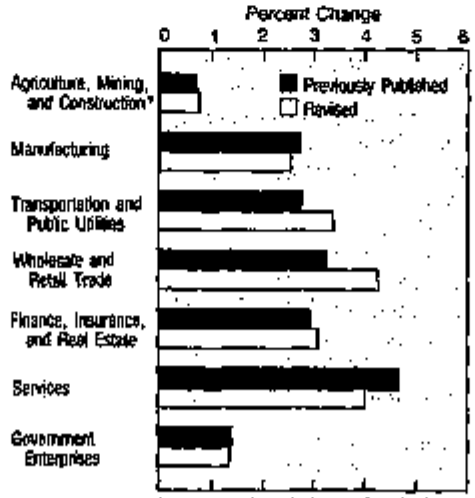
THIS article reports on the first phase of BEA's work to improve the estimates of constant-dollar gross product by industry. In 1989, BEA suspended publication of these estimates in response to criticism of their accuracy and outlined its plans to improve them.[1] Revised constant-dollar estimates for 1977–87 and new estimates for 1988, the results of the first phase of this work, are presented in this article.

The picture of U.S. industries shown by the gross product estimates is not altered much by the revision. In terms of growth rates for broad industry groups, the general pattern is the same both before and after the revision: Wholesale and retail trade and services show the highest constant-dollar growth rates, and government enterprises and the agriculture, mining, and construction group show the lowest (chart 4). The average annual rate of growth of manufacturing industries—of special interest to many users—was estimated at 2.7 percent for 1977–87 before the revision, and it is now estimated at 2.5 percent. Several of the improvements in methodology that are incorporated into the revised estimates had surprisingly little impact on most industries.

The first part of the article provides an overview of the gross product by industry series; it describes the estimating methods used by BEA, the improvements incorporated into the revised estimates, how these improvements address the earlier criticisms, and the further work to be done to improve the estimates. The second part discusses the impact of the revisions on industry growth rates. A "Technical Note" describes the methodologies used for the previously published estimates and the revised estimates. The estimates are presented in a set of tables at the end of the article.

CHART 4

GNP by Industry in 1982 Dollars: Annual Average Percent Change, 1977-87, Previously Published and Revised



Note—1987 is the terminal year because it was the last year for which the previously published estimates were available.

1. Includes forestry and fisheries.

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Gross Product by Industry—An Overview

Gross product, or gross product originating (GPO), by industry is the contribution of each industry—including government and the rest of the world—to GNP.[2] An industry's GPO, often referred to as its "value added," is equal to its gross output (sales or receipts and other operating income, plus inventory change) minus its intermediate inputs (consumption of goods and services purchased from other industries or imported).

In concept, GNP measured as the sum of GPO in all industries is the same as GNP measured in two other ways: (1) As the sum of expenditures (consumer spending, investment, net exports, and government purchases) and (2) as the sum of costs incurred (compensation of employees, net interest, indirect business taxes, etc.) and profits earned in production. In practice, BEA implements these three ways using less than perfectly consistent source data, and the resulting totals are not the same. For current-dollar estimates, BEA measures what it refers to as "GNP" as the sum of the expenditure components, and it uses "charges against GNP" to refer to the sum of costs incurred and profits earned. The difference between GNP and charges against GNP is the statistical discrepancy. In constant dollars also, GNP is measured as the sum of the expenditure components. Constant-dollar charges against GNP

NOTE.—BEA's gross product by industry program is under the guidance of Robert P. Parker, Associate Director for National Economic Accounts. The industry estimates were prepared under the supervision of Michael F. Mohr, Chief of the GNP by Industry Branch of the National Income and Wealth Division. The preparation of the estimates involved the following staff: Norman Bakka, Mary Carol Barron, Felicia Candela, Vesta Jones, Sharlene Lum, Robert Sylvester, and Gregory Won. Marilyn Baker, Getty Mumford, and Angela Williams provided statistical and secretarial services. Mark Planting and Paula Young, of the Interindustry Economics Division, provided special tabulations from BEA's input-output tables.

1. See "Gross Product by Industry: Comments on Recent Criticisms," SURVEY OF CURRENT BUSINESS 68 (July 1988): 133–133. Before their publication was suspended in 1989, annual estimates of gross product by industry in current dollars and in constant dollars appeared in tables 6.1 and 6.2, respectively, in "National Income and Product Accounts Tables," which usually is published in the July Survey.

2. The industrial distribution of the GPO of private activities is based on the 1972 Standard Industrial Classification (SIC), a system that provides a classification for establishments (that is, economic units, generally at a single physical location, where business is conducted or where services or industrial operations are performed). Establishments are classified into an SIC industry on the basis of their principal product. Thus, establishment data cover both the principal products included in the SIC and the products of those establishments that are primary to other SIC industries.

is not estimated, however, because price indexes for deflation cannot be associated with income measures as they can be with the goods and services that make up the expenditure measures.[3]

GPO estimates in current dollars are prepared as distributions by industry of the components of charges against GNP. Thus, the sum of the current-dollar GPO estimates also differs from current-dollar GNP by the statistical discrepancy. To prepare constant-dollar GPO estimates, a different strategy—described in the next section—is used. The sum of the constant-dollar GPO estimates differs from constant-dollar GNP by the constant-dollar statistical discrepancy plus an additional discrepancy, titled the "residual."

Estimating methods for constant-dollar GPO

The strategy for estimating constant-dollar GPO by industry is to work with the measures of goods and services—gross output and intermediate inputs—that are used to define GPO. The industry estimates can then be derived using one of three methods: Double deflation, extrapolation, or direct deflation. The method chosen usually depends on the availability of source data.

In the double-deflation method, constant-dollar GPO is derived as the difference between constant-dollar gross output and constant-dollar intermediate inputs. In practice, there are at least three variants of this method, and the variant chosen depends on the availability of source data.

(1) When complete and consistent gross output and inputs series are available, these series can be deflated, and constant-dollar GPO can be measured as the difference between them.

(2) When only complete and consistent gross output and GPO series are available, a current-dollar input series can be derived and then deflated for use in the output-minus-input calculation.

(3) When only consistent but incomplete gross output and inputs series are available, the available series can be used to derive a GPO deflator to apply to the appropriate current-dollar GPO estimate.

(See the "Technical Note" for more information.)

In the extrapolation method, constant-dollar GPO is derived by extrapolating the base-year value of GPO (for which the current-dollar value equals the constant-dollar value) by an indicator series. The indicator series usually is constant-dollar gross output, the number of employees, or the number of hours worked.

In the direct-deflation method, constant-dollar GPO is derived by deflating current-dollar GPO. The index used for deflation usually is gross output prices or earnings.

Generally, double deflation is the conceptually preferred method because it measures GPO in the same way that GPO is defined. Moreover, assuming the availability of appropriate source data, double deflation is preferred because it allows for changes over time in the relationships between gross output and inputs. The extrapolation method will yield the correct results only if the rates of change in constant-dollar gross output and inputs are the same. The direct-deflation method will yield the correct results if the deflators for both constant-dollar gross output and inputs are the same.

Double deflation is not the preferred method for the two industries—private households and general government—for which gross output and GPO are defined as employee compensation and for the industry—the rest of the world—for which GPO is defined as net flows of factor incomes. For private households and general government, the most appropriate method is extrapolation by an indicator of labor input that reflects changes in productivity. For the rest of the world, the most appropriate method is direct deflation using a composite deflator calculated from the GPO of the industry and country in which the income was earned.

Improvements in the revised estimates

The revised constant-dollar GPO series reflect both the wider use of double deflation and improvements in the source data underlying the industry estimates derived using double deflation. In the revised estimates, double deflation was used in 51 industries, which accounted for 87 percent (in 1987) of the total GPO for industries for which it is the preferred method, compared with 25 industries, which accounted for 43 percent, in the previously published estimates (table 1).[4] Further, the double-deflation method was applied more consistently in the revised estimates; the same variant of double deflation was used for 49 of the 51 industries.

For most of the 25 industries for which GPO had previously been estimated using the double-deflation method, the source data were improved in three major ways.[5] The estimates of gross output were improved by benchmarking them to information from BEA's 1977 and 1982 input-output (I-O) tables to provide a more complete and consistent framework for estimating gross output and input and by preparing the constant-dollar estimates in greater detail. The estimates of inputs were improved by using information on their composition from the I-O tables for 1977 and 1981–85 to replace the estimates for 1982, which had been used for all years. Finally, the prices of inputs were improved by introducing prices of imported goods and services and by introducing more appropriate prices for service inputs.

For 26 of the 36 industries for which GPO had previously been estimated using either extrapolation or direct deflation but for which double deflation is the preferred method, the double-deflation method was introduced. The introduction of double deflation was made possible by the development of new estimates of gross output, input composition, and input prices incorporating the source-data improvements referred to in the preceding paragraph.

Addressing the earlier criticisms

The criticisms of the accuracy of BEA's previously published constant-dollar GPO estimates focused on four major areas: The adjustments BEA made so that the GPO estimates would be more consistent with the constant-

3. Constant-dollar estimates of two other aggregates measured in current dollars as sums of cost and profit components are derived from constant-dollar GNP. These aggregates—net national product and national income—are derived by preparing constant-dollar estimates of capital consumption allowances with capital consumption adjustment and of nonfactor charges (business transfer payments, indirect business taxes, and the current surplus of government enterprises) and subtracting these estimates from constant-dollar GNP.

4. In this count, two parts of the real estate industry—nonfarm housing services and other real estate—are counted as separate industries.

5. For a summary of the sources and methods used for the previously published GPO estimates, see "Gross Product by Industry, 1958," *Survey* 67 (April 1987): 25–28.

dollar GNP estimates, the use of BEA's price index for computers, the use of indexes that covered only domestic prices and that only roughly approximated service prices to estimate constant-dollar inputs, and the use of out-of-date information on the composition of inputs.[6] The last two areas are addressed by the improvements incorporated into the revised estimates; the first two are discussed briefly in the following paragraphs.

When BEA published revised 1947–84 estimates in 1985, it adjusted the constant-dollar GPO of manufacturing and nonmanufacturing industries for 1947–81. The adjustments were criticized as being too subjective.[7] BEA made the adjustments to reduce the residual, which it views as a measure of the error in the constant-dollar GPO estimates. This view is supported by the fact that the source data available to prepare these estimates are less accurate and comprehensive than the source data available to prepare constant-dollar GNP (from expenditure estimates). Most of the adjustments were applied to manufacturing. They lowered the 1947–72 estimates of manufacturing by about the same percentage each year and lowered the estimates for 1973–82 by successively smaller percentages. The effect of the adjustments was to lower the initial constant-dollar 1972 estimate by $60 billion and the 1977 estimate by $25 billion, thus raising the growth rate of GPO in manufacturing from 1972 to 1982. In the revised estimates, the residuals are relatively small, and adjustments were not deemed necessary. (See line 82 of table 2.) Nevertheless, BEA still views the residual as a measure of error in the constant-dollar GPO estimates and the adjustment of GPO estimates to reduce the residual, when necessary, as an appropriate procedure.

In 1985, BEA introduced a new price index for computers. The index declined at an average annual rate of 15 percent from 1977 to 1987, and its steep decline contributed to the growth of both constant-dollar GNP and manufacturing GPO. The criticism was that the index, which is used to

6. See, for example, Lawrence Mishel, *Manufacturing Numbers: How Inaccurate Statistics Conceal U.S. Industrial Decline* (Washington, DC: Economic Policy Institute, 1988) and Edward F. Denison, *Estimates of Productivity Change by Industry* (Washington, DC: The Brookings Institution, 1989).

7. Mishel, *Manufacturing Numbers*, 18–23.

Table 1.—Previously Published and Revised Methods for Estimating Constant-Dollar Gross Product Originating

Industry	Method [1]	
	Previously published	Revised
Agriculture, forestry, and fisheries:		
Farms	Double deflation	(*)
Agricultural services, forestry, and fisheries	Extrapolation	Double deflation.
Mining:		
Metal mining	Extrapolation	Double deflation.
Coal mining	Extrapolation	Double deflation.
Oil and gas extraction	Extrapolation	Double deflation.
Nonmetallic minerals, except fuels	Extrapolation	Double deflation.
Construction	Double deflation	(*)
Manufacturing:		
Petroleum and coal products	Extrapolation	Double deflation.
Other manufacturing industries [2]	Double deflation	(*)
Transportation:		
Railroad transportation	Double deflation	(*)
Local and interurban passenger transit	Extrapolation	Double deflation.
Trucking and warehousing	Direct deflation	Double deflation.
Water transportation	Extrapolation	Double deflation.
Transportation by air	Extrapolation	Double deflation.
Pipelines, except natural gas	Extrapolation	Double deflation.
Transportation services	Extrapolation	(*)
Communication:		
Telephone and telegraph	Direct deflation	Double deflation.
Radio and television broadcasting	Direct deflation	Double deflation.
Electric, gas, and sanitary services	Double deflation	(*)
Wholesale trade	Direct deflation	Double deflation.
Retail trade	Extrapolation	Double deflation.
Finance, insurance, and real estate:		
Banking	Extrapolation	(*)
Credit agencies other than banks	Extrapolation	(*)
Security and commodity brokers, and services	Extrapolation	Double deflation.
Insurance carriers	Extrapolation	Double deflation.
Insurance agents and brokers, and services	Extrapolation	Double deflation.
Real estate: [3]		
Nonfarm housing services	Double deflation	(*)
Other real estate	Direct deflation	(*)
Holding and other investment companies	Extrapolation	(*)
Services:		
Hotels and other lodging places	Extrapolation	Double deflation.
Personal services	Direct deflation	Double deflation.
Business services	Extrapolation	(*)
Auto repair, services, and garages	Direct deflation	Double deflation.
Miscellaneous repair services	Extrapolation	Double deflation.
Motion pictures	Direct deflation	(*)
Amusement and recreation services	Direct deflation	Double deflation.
Health services	Extrapolation	Double deflation.
Legal services	Extrapolation	Double deflation.
Educational services	Extrapolation	Double deflation.
Social services and membership organizations	Direct deflation	(*)
Miscellaneous professional services	Direct deflation	(*)
Private households	Direct deflation	(*)
Government and government enterprises:		
General government	Extrapolation	(*)
Government enterprises	Extrapolation	(*)
Rest of the world	Direct deflation	(*)

* Same method as used for previously published estimates.

1. In both the previously published and revised estimates, several variants are used in implementing the double-deflation method. For a description of the variants and the identification of the industries using them, see the text, p. 30.

2. The other 20 manufacturing industries, as shown in tables 5 and 6, are not listed separately because estimates for them are all prepared using the same method.

3. The real estate industry is listed in two parts because the estimates for the two parts are prepared using different methods.

prepare the constant-dollar estimates, is not consistent with the resource-cost concept of capital that BEA uses in measuring other types of capital goods.[8] As explained in an article in the SURVEY OF CURRENT BUSINESS, BEA does not agree with this criticism and will continue to use the index for measuring constant-dollar GNP and GPO.[9] In the criticism, it was noted that the use of the index made the estimates much more sensitive to the choice of the base year in calculating constant-dollar measures. BEA plans to introduce estimates with alternative base years in the next comprehensive revision of the national income and product accounts (NIPA's) to help deal with this problem.[10]

8. Denison, *Estimates*, 8–10.
9. See Allan H. Young, "BEA's Measurement of Computer Output," SURVEY 69 (July 1989): 108–115.
10. See Allan H. Young, "Alternative Measures of Real GNP," SURVEY 69 (April 1989): 27–34.

Further work to improve the estimates

The 1987 and 1988 current- and constant-dollar estimates presented in this article are not fully consistent with the presently published GNP estimates; they do not yet incorporate source data used in the July 1990 revisions of the NIPA's. Revised estimates for 1987 and 1988 and estimates for 1989 consistent with the published estimates will be published in the April 1991 SURVEY.

BEA will continue to address the shortcomings of the revised GPO estimates, and it plans to incorporate additional improvements into the estimates to be released following the next comprehensive NIPA revision. The further work will focus on improving procedures for deriving the composition of inputs for years not covered by I-O tables, on developing and incorporating improved service prices, and on extending the use of double deflation. Improved estimates will also be prepared for years before 1977.

Long-term improvement in the estimates of both GPO and GNP will require additional research apart from the GPO improvement work. Research on the prices of services is one area. The service prices incorporated into the revised GPO estimates improve on the previous ones because they cover a far wider range of services and because they represent prices of inputs rather than implicit deflators of GPO. However, the formidable statistical problems of measuring prices of many services are still present in the new estimates; only a substantial research effort over many years holds any promise of overcoming these statistical problems. Research on the definition of output of several industries—most notably, financial services—is another area in which some research is under way.

Table 2.—Method and Source Data for Estimating Constant-Dollar Gross Product Originating for Industries for Which Double Deflation Is Not Used

Industry	Method	Major source data [1]
Transportation services	Extrapolation	BEA persons engaged in production.
Banking	Extrapolation	BEA persons engaged in production.
Credit agencies other than banks	Extrapolation	BEA persons engaged in production.
Real estate, except nonfarm housing services	Direct deflation	Index of rent for office buildings from trade source and BEA estimates.
Holding and other investment companies	Extrapolation	BEA persons engaged in production.
Business services	Extrapolation	BLS employment weighted by Census Bureau receipts.
Motion pictures	Direct deflation	BLS prices and earnings.
Social services and membership organizations	Direct deflation	BEA average wages and salaries per full-time equivalent employee.
Miscellaneous professional services	Direct deflation	BEA average wages and salaries per full-time equivalent employee.
Private households	Direct deflation	BLS prices.
Government:		
General government	Extrapolation	BEA hours worked weighted by BEA measures of experience and education.
Government enterprises	Extrapolation	BEA and Census Bureau employment and BLS output indexes.
Rest of the world	Direct deflation	BEA implicit price deflator for net domestic product.

1. Source data provide either a price index for deflation of gross product originating or a quantity extrapolator of base-year value of gross product originating.

BEA Bureau of Economic Analysis
BLS Bureau of Labor Statistics

The Impact of the Revisions on Industry Growth Rates

Chart 4 summarizes the impact of the revisions by showing, for seven broad groups of industries, the average annual rate of growth of constant-dollar GPO from 1977 to 1987 before and after revision. The chart shows that the general pattern of high- and low-growth industries is the same both before and after the revision. Wholesale and retail trade and services show the highest constant-dollar growth rates, and government enterprises and the agriculture, mining, and construction group show the lowest. The average annual rate of growth of manufacturing industries, previously estimated at 2.7 percent, is now estimated at 2.5 percent.

Impact of changes in methodology.—One reason for the similarity of growth rates before and after the revision is that several of the changes in methodology had surprisingly little impact on most industries. For example, introducing import prices in the deflation of intermediate inputs raised manufacturing growth from 1977 to 1987 by an annual average rate of less than 0.1 percent. From 1979 to 1985, when the exchange value of the U.S. dollar rose, the effect of introducing import prices was to lower manufacturing growth by 0.2 percent per year; from 1977 to 1979, the effect was strongly in the opposite direction. Outside of manufacturing, the effects of import prices were small in all years.

The methodological change that provided for changes in the composition of intermediate inputs rather than for use of estimated 1982 composition for all years also had a minor impact on most industries. From 1977 to 1985 (the latest year in which the composition changes in the revised estimates), the impact on total manufacturing was to raise manufacturing growth by an average of 0.2 percent per year: Growth was raised before 1982 and lowered thereafter. The revision largely reflected the use of variable input composition and its impact on the inputs of the nonelectrical machinery industry; the computer portion of this industry has used increasing quantities of inputs accompanied by falling prices of inputs. The use of variable composition reduced the importance of falling input prices in the years before 1982 and therefore lowered the growth of inputs and raised the estimated growth of GPO. After 1982, these effects were in the opposite direction.

The methodological change that introduced improved prices for services also had a minor overall impact. The impact was minor because the new service prices, as did the previous ones, rise much more rapidly, than do the prices of goods. A comparison of two deflators illustrates the difference: The implicit deflator of gross output in the service industries that are double deflated rose at an average annual rate of 7.6 percent from 1977 to 1987, while the implicit deflator of gross output in the manufacturing industries rose at a rate of only 4.3 percent. Omitting the petroleum refining and nonelectrical machinery industries because prices in them are heavily influenced by special factors raises the manufacturing increase to 4.7 percent, still well below the increase in services.

The largest industry revisions.—The largest revisions in the broad industry groups shown in the chart are mainly due to the combined impact of two factors: The extension of double deflation to many additional industries and the rapid rise of service prices relative to goods prices. Other changes—including revisions in gross output, new price series, and revisions in current-dollar gross product—have sizable impacts on a few individual industries but not on the broad groups.

For wholesale and retail trade, which displays the largest upward revision in the chart, the replacement of extrapolation by double deflation introduces into the calculations input prices that, on average, increase rapidly because of the importance of intermediate services in these industries (inputs purchased by trade industries do not include the goods to be resold, because gross output is defined as the margin between sales and purchases of goods). The rapid increase in prices of inputs depresses the growth of constant-dollar inputs, which, in turn, increases the growth of constant-dollar GPO. To a considerable extent, the upward revision in the growth of transportation, communication, and public utilities reflects the same forces.

The downward revision in the services industries also reflects the increased use of double deflation and the behavior of service prices relative to goods prices, but these factors interact in a different way in the services industries. Here, the increased use of double deflation introduces intermediate input prices that tend to rise less than the price of gross output, because in the services industries—in contrast to the trade industries—gross output reflects services and inputs reflect both goods and services. Estimated constant-dollar inputs therefore tend to rise relatively rapidly, which, in turn, lowers the growth of GPO.

Revisions in manufacturing.—The small downward revision in the growth of manufacturing industries is entirely due to nonelectrical machinery. In part, it is the result of dropping an adjustment that had been made in 1977 to reduce the residual; as the previous section notes, the revised estimates have not been adjusted to reduce the residual. In addition, the revision in nonelectrical machinery is primarily the result of departing from the assumption of fixed input composition. This departure had the effect of increasing the estimated growth of constant-dollar inputs, which, in turn, lowered the growth of constant-dollar GPO.

Technical Note

BEA has incorporated major improvements in methodology—i.e., in estimating methods and source data—into the revised estimates of constant-dollar GPO. No changes in methodology have been made to the previously published current-dollar GPO estimates; the 1986 and 1987 estimates were revised only to reflect changes introduced in the July 1989 annual NIPA revision, and several estimates for earlier years were revised to eliminate industry-allocation errors uncovered during the review of the revised estimates.

The first section of this note reviews the methodology for the previously published estimates of constant-dollar GPO by industry. The second section presents the methodology for the revised estimates.

Methodology for the previously published estimates

In the previously published constant-dollar estimates of GPO by industry, double deflation was used for farms; construction; manufacturing industries except petroleum and coal products; railroad transportation; electric, gas, and sanitary services; and the nonfarm housing services part of the real estate industry. The estimates were prepared using one of three variants—the choice depending on the availability of source data.

(1) For farms and nonfarm housing services, where complete and consistent gross output and intermediate inputs series are available, constant-dollar GPO was measured as the difference between constant-dollar gross output and constant-dollar inputs.[11]

(2) For manufacturing industries except petroleum and coal products, where only a gross output series consistent with the current-dollar GPO series is available, the derived input variant was used. Current-dollar inputs were derived as the difference between current-dollar gross output and current-dollar GPO, and constant-dollar inputs were calculated by deflating the derived current-dollar series using a composite input deflator that reflected the estimated composition of inputs in 1982 (based on information from the 1977 input-output (I-O) table) and the price indexes for domestic inputs.[12] For goods inputs, either producer price indexes or other appropriate price indexes were used. For service inputs, GPO deflators for the

11. In international literature, it is this variant that is usually referred to as "double deflation." That literature is often couched in terms of input-output tables or production accounts by industry, where gross output and intermediate inputs are displayed. See, for example, United Nations, *Manual on National Accounts at Constant Prices*, Statistical Papers, Series M, No. 64 (New York: United Nations, 1979): 8–11.

12. For years prior to 1972, the composition of inputs was estimated using information from earlier I-O tables.

Table 3.—Principal Source Data and Estimating Methods Used in Preparing Estimates of Gross Output for Use in Double Deflation

Industry [1]	Current dollars	Constant dollars
	Extrapolator or interpolator of benchmark values [2]	Price index for deflation or quantity extrapolator of base-year value
Agriculture, forestry, and fisheries:		
Farms	Cash receipts from marketings, inventory change, and other receipts from USDA (1977, 1982).	Prices received by farmers from USDA.
Agricultural services, forestry, and fisheries:		
Agricultural services	Receipts for agricultural services, forestry, and fisheries from IRS tabulations of business tax returns less gross output of forestry and fisheries (1977).	Index of selected prices paid by farmers from USDA.
Forestry	Shipments of logging camps and contractors from Census Bureau quinquennial census and annual survey (1977).	PPI's.
Fisheries	Value of fish landed from NOAA (1977).	Fish landed from NOAA.
Mining:		
Metal mining	Physical quantity produced times average price: For uranium, physical quantity from BOM and average price from DOE; for all others, quantities and prices from BOM (1977, 1982).	Quantity produced from BOM.
Coal mining	Physical quantity produced times average price, both from DOE (1977, 1982).	Quantity produced from DOE.
Oil and gas extraction	Physical quantity produced times average price, both from NEA's through 1985 and from DOE for 1986–88 (1977, 1982).	Quantity produced from NEA's and DOE.
Nonmetallic minerals, except fuels	Physical quantity produced times average price, both from BOM (1977, 1982).	Quantity produced from BOM.
Construction:		
For the Department of Defense	Expenditures from DOD (1982).	For most military construction, BEA indexes based on DOD prices; for other construction, cost indexes from trade sources and government agencies.
For State and local highways	Expenditures from DOT (1982).	For new construction, cost indexes from government agencies; for maintenance and repair, CPI for home maintenance and repair services.
For private electric and gas utilities	Expenditures from Federal regulatory agencies and trade source (1982).	Cost indexes from trade sources and government agencies.
For farms, excluding residential	Expenditures from USDA (1982).	Cost index from trade source and price deflator for single-family houses from Census Bureau.
For other nonresidential:		
New construction	Value put in place from Census Bureau construction survey (1982).	Cost indexes from trade sources and government agencies and price deflator for single-family houses from Census Bureau.
Maintenance and repair	Value put in place from Census Bureau construction survey (1982).	CPI for home maintenance and repair services.
For other residential:		
New construction	Value put in place from Census Bureau construction survey (1982).	Price deflator of single-family houses from Census Bureau.
Maintenance and repair	Expenditures by owner-occupants from BLS survey and by landlords from Census Bureau survey (1982).	CPI for home maintenance and repair services.
Manufacturing	Shipments and inventory change from Census Bureau quinquennial census and annual survey [3].	PPI's and BEA computer price index.
Transportation:		
Railroad transportation	Total operating revenue for Class I railroads and AMTRAK (1977, 1982).	Composite index of IPD for Class I freight, from revenue ton-miles from trade source, and of IPD for AMTRAK passenger, from passenger miles from NRPC.
Local and interurban passenger transit:		
Taxicabs	PCE (1977).	CPI for taxi fares.
Intercity buses	Operating revenues from trade source (1977, 1982).	Passenger miles from trade source.
School buses	Wages and salaries from BLS (1977, 1982).	Employment from BLS.
Other local transit	Operating revenues of private local transit systems from trade source (1977).	Passenger trips from trade source.
Trucking and warehousing	For 1977–83, operating revenues for Class I motor carriers of property from ICC; for 1984–88, Census Bureau annual survey (1977, 1982).	Ton-miles from DOT.
Water transportation	Receipts from IRS tabulations of corporate tax returns (1982).	Ton-miles for deep sea foreign transportation from BEA, and tons for marine cargo and ton-miles for other water transportation from DOD.
Transportation by air	Operating revenues of air carriers and of Federal Express from DOT and public sources (1977, 1982).	For passenger, revenue passenger miles for domestic and for international travel from DOT. For freight and mail, ton-miles for domestic and international freight and for domestic and international mail from DOT. For all other, composite index of IPD for passenger, freight, and mail.
Pipelines, except natural gas	Operating revenues from trade source (1977, 1982).	Ton-miles from trade source.
Communications:		
Radio and television broadcasting	Advertising expenditures from trade source (1977, 1982).	Cost indexes from trade source.
Telephone and telegraph	Revenues from FCC (1977, 1982).	PPI's.

Table 3.—Principal Source Data and Estimating Methods Used in Preparing Estimates of Gross Output for Use in Double Deflation—Continued

Industry [1]	Current dollars	Constant dollars
	Extrapolator or interpolator of benchmark values [2]	Price index for deflation or quantity extrapolator of base-year value
Electric, gas, and sanitary services:		
Electric utilities	For private utilities, revenues from DOE. For rural cooperatives, revenues from USDA (1977, 1982).	Kilowatthours from trade source.
Gas utilities	Revenues of gas pipeline and utilities from trade source (1977, 1982).	BTU's from trade source.
Sanitary services	Receipts from IRS tabulations of business tax returns (1977, 1982).	CPI for water and sewerage maintenance.
Wholesale trade:		
Merchant wholesalers	Ratio of gross margin to sales (margin rate) times sales: For 1977–82, margin rate from quinquennial census and sales from Census Bureau annual survey; for 1983–88, both from annual survey (1977, 1982) [4].	Sales deflated by PPI's.
Manufacturers' sales branches and sales offices.	For equipment rental, interpolation of quinquennial census receipts; for 1988, judgmental trend. For other receipts, manufacturing shipments from Census Bureau annual survey (1977, 1982).	For equipment rental, IPD from BEA capital stock statistics. For other receipts, shipments deflated by PPI's.
Agents and brokers	Merchant wholesalers margin rate times sales: For 1977–82, margin rate from quinquennial census and sales from Census Bureau annual survey; for 1983–88, both from annual survey (1977, 1982).	Merchant wholesalers sales deflated by PPI's.
Retail trade:		
Eating and drinking places	Sales from quinquennial census and from Census Bureau annual survey (1977, 1982).	CPI's.
Other	Ratio of gross margin to sales from Census Bureau quinquennial census times sales from Census Bureau annual survey (1977, 1982).	Base-year margin rate times sales deflated by CPI's.
Finance, insurance, and real estate:		
Security and commodity brokers, and services.	Securities commissions, revenue from sale of investment company securities, profits on underwriting/selling, gains on trading and investment accounts and other revenues excluding interest, and revenues earned by exchanges; receipt items from SEC and interest from SEC and BEA (1977, 1982).	For securities commissions, number of public securities orders from SEC and trade sources; for mutual funds, IPD for securities commissions; for underwriting, new securities registrations from SEC; for all others, IPD for GNP.
Insurance carriers	Net premiums for health, auto, accident, property, and workers' compensation insurance from trade sources; PCE for expense of handling life insurance (1977, 1982).	For health and life insurance, IPD's for PCE. For all others, composite index of BEA IPD for workers' compensation and CPI for auto and property insurance.
Insurance agents and brokers, and services	Receipts from IRS tabulations of business tax returns (1977, 1982).	Insurance carrier deflators weighted by commissions from trade source.
Real estate:		
Nonfarm housing services	PCE for owner- and tenant-occupied nonfarm dwellings (1977, 1982).	IPD for PCE.
Services:		
Hotels and other lodging places	Receipts from Census Bureau quinquennial census and annual survey (1977, 1982).	Room-rate index from trade source.
Personal services	Receipts from Census Bureau quinquennial census and annual survey (1977, 1982).	CPI's.
Automotive repair, services, and garages	Receipts from Census Bureau quinquennial census and annual survey (1977, 1982).	CPI's.
Miscellaneous repair services	Receipts from Census Bureau quinquennial census and annual survey (1977, 1982).	CPI's and average annual earnings from BLS.
Amusement and recreation services	Receipts from Census Bureau quinquennial census and annual survey (1977, 1982).	CPI's.
Health services:		
Hospitals	Receipts from trade sources (1977, 1982)	HCFA index of input prices and CPI for hospital room.
Other health services	Receipts from Census Bureau quinquennial census and annual survey (1977, 1982).	CPI's and HCFA index of input prices.
Legal services	Receipts from Census Bureau quinquennial census and annual survey (1977, 1982).	CPI for legal services.
Educational services	PCE for private education (1977, 1982)	IPD for PCE.

1. For many industries, gross output is estimated at more detailed industry levels than shown in this table. For mining, for example, gross output is estimated for 44 industries. This table combines the listing when the methodology is the same within the listing and separates the listing when it differs.

2. The year(s) in parentheses represents the benchmark input-output table to which gross output is directly benchmarked.

3. The manufacturing gross output estimates were benchmarked to gross output from the 1977, 1982, and 1987 Censuses of Manufacturing. For 1977 and 1982, these census data differ very slightly from the corresponding input-output measures because the I-O measures have been adjusted for misreporting and include the margin on resales; the census measures include the total value of resales.

4. Gross margin, which is used to measure the gross output of most of the wholesale and retail trade industry, equals sales minus cost of goods sold.

BEA	Bureau of Economic Analysis (DOC)	EIA	Energy Information Administration (DOE)	NOAA	National Oceanic and Atmospheric Administration (DOC)
BLS	Bureau of Labor Statistics	FCC	Federal Communications Commission		
BOM	Bureau of Mines	HFCA	Health Care Financing Administration	NRPC	National Railroad Passenger Corporation
CPI	Consumer Price Index (BLS)	ICC	Interstate Commerce Commission	PCE	Personal consumption expenditures
DOC	U.S. Department of Commerce	IPD	Implicit price deflator	PPI	Producer Price Index (BLS)
DOE	U.S. Department of Energy	IRS	Internal Revenue Service	SEC	Securities and Exchange Commission
DOT	U.S. Department of Transportation	NEA	National Energy Accounts (DOC, Office of Business Analysis)	USDA	U.S. Department of Agriculture

corresponding industries were used. Constant-dollar GPO was then derived as the difference between the constant-dollar gross output and the derived constant-dollar inputs.

(3) For construction, railroad transportation, and electric, gas, and sanitary services, where the available series of gross output and inputs were not consistent with the current-dollar GPO estimates because they covered only part of the industry, the derived GPO deflator variant was used. The available gross output and inputs series were deflated and used to calculate a GPO deflator, and that derived GPO deflator was used to deflate the current-dollar GPO estimate.

For the non-double-deflated industries, the extrapolation method and the direct deflation method were used in about equal numbers of industries.

Methodology for the revised estimates

This section describes the extension of the double-deflation method to additional industries and the new and improved estimates of gross output, input composition, and input prices that were prepared for the double-deflated industries. More detailed information will be available in April; its availability will be announced in the SURVEY.

Estimating methods.—The use of double deflation was extended to an additional 26 industries. As a result, the share of 1987 GPO for which double deflation is the preferred method and was used increased from 48 percent to 87 percent. Further, for all double-deflated industries except farms and nonfarm housing services, double deflation was implemented using the same variant—the one used for manufacturing industries except petroleum and coal products in the previously published estimates: Directly measured constant-dollar gross output less derived constant-dollar inputs.

Double deflation was not used for 10 industries for which it is the preferred method, because adequate source data were not available to prepare estimates of current-dollar gross output or of constant-dollar gross output or of both. The largest of these industries are business services, banking, and real estate except nonfarm housing services. The key source data used in the preparation of GPO for these and for other industries for which double deflation is not used are shown in table 2.

Table 4.—Principal Sources of Service Input Prices

Service input [1]	Source [2]
Agricultural services	IPD for agricultural services gross output.
Railroad transportation:	
Dining car receipts, business travel	CPI for food away from home.
Other passenger train services	CPI for intercity train fares.
Rail freight transportation	IPD for freight gross output.
Other railroad services	IPD for freight gross output.
Local and interurban passenger transit:	
Services from local private transit systems	IPD for local transit system gross output.
Taxicabs	CPI for taxi fares.
Other	IPD for intercity bus gross output.
Trucking and warehousing	IPD for trucking and warehousing gross output.
Water transportation	IPD for water transportation gross output.
Transportation by air:	
Domestic passenger	IPD for domestic passenger gross output.
International passenger	IPD for international passenger gross output.
Freight and express	IPD for freight and express gross output.
Other air services	IPD for transportation by air.
Pipelines, except natural gas	IPD for pipelines, except natural gas gross output.
Transportation services:	
Private carline services	IPD for boxcar rental.
Other	IPD for transportation services GPO.
Telephone and telegraph:	
Telephone	IPD for telephone gross output.
Telegraph services	PPI for telephone services.
Radio and television broadcasting	IPD for radio and television broadcasting gross output.
Electric, gas, and sanitary services:	
Electric utilities	PPI for electric power.
Gas pipeline	IPD for gas pipeline gross output.
Gas utilities	IPD for gas utility gross output.
Sanitary services	CPI for water and sewerage maintenance.
Wholesale trade:	
Merchant wholesalers and agents and brokers	IPD for merchant wholesalers and agents and brokers gross output.
Manufacturers' sales offices and sales branches	IPD for manufacturers' sales offices and sales branches gross output.
Retail trade:	
Eating and drinking	IPD for eating and drinking gross output.
Other	IPD for other retail trade gross output.
Banking:	
Imputed service charges	IPD for financial services furnished without payment by commercial banks.
Other	CPI for personal financial services.
Credit agencies other than banks:	
Imputed service charges	IPD for financial services furnished without payment by savings and loan associations.
Other	CPI for personal financial services.
Security and commodity brokers, and services:	
Securities underwriting	IPD for underwriting gross output.
Securities and commodity trading	IPD for securities commissions gross output.
Services allied with exchange of securities	IPD for security and commodity brokers, and services gross output.
Other services	IPD for GNP.
Insurance carriers:	
Automobile insurance	CPI for automobile insurance.
Nonlife insurance services, except automobile	CPI for property and household insurance.
Other	IPD for insurance carrier gross output.
Insurance agents and brokers, and services	IPD for insurance agents and brokers, and services gross output.
Real estate services:	
Nonfarm business rental and property management	Rental rate per square foot from trade source.
Farm rental	IPD for rental value of farm housing PCE.
Rent paid by nonprofits	IPD for capital consumption allowance of nonprofit organizations.
Royalties for oil and gas mining	IPD for oil and gas extraction gross output.
Royalties, except oil and gas mining	IPD for PCE.
Commissions paid to real estate dealers	IPD for new nonresidential building construction.
Condominium association fees and assessments by cooperatives.	CPI for home maintenance and repair services.
Other	IPD for real estate GPO.

Table 4.—Principal Sources of Service Input Prices—Continued

Service input [1]	Source [2]
Personal services:	
Funeral and burial expenses	CPI for funeral expenses.
Other	CPI for laundry and dry cleaning.
Business services:	
Advertising	Cost indexes by type of media from trade sources.
Maintenance, cleaning, disinfecting, and exterminating.	CPI for home maintenance and repair services.
Photofinishing	IPD for film development PCE.
Other business services	IPD for business services gross output.
Auto repair, services, and garages:	
Repairs, tire retreading, parking, and washing	CPI for automobile maintenance and repair.
Other	CPI for other auto-related fees.
Miscellaneous repair services:	
Radio, TV, refrigeration and air conditioning, and electrical and electronic repairs.	CPI for appliance and furniture repairs.
Other	Average annual earnings from BLS.
Motion pictures services:	
Production and allied services	Average annual earnings from BLS.
Distribution and allied services	Average annual earnings from BLS.
Amusement and recreation services:	
Sports, recreation, and amusements	IPD for commercial participant amusement and commercial amusement n.e.c, PCE.
Theatrical, dance, symphony, and spectator sports productions.	CPI for admissions.
Health services:	
Physicians services	CPI for physicians.
Other	CPI for other medical professionals.
Legal services	CPI for legal services.
Education services:	
Vocational schools, except high schools	IPD for commercial and vocational schools PCE.
Higher education and related services	IPD for private higher education PCE.
Social services	Average annual earnings from BLS.
Membership organizations:	
Membership organization expenses	BEA earnings and expense index.
Business associations	Average annual earnings from BLS.
Professional organizations	Average annual earnings from BLS.
Miscellaneous professional services:	
Noncommercial museums and art galleries	IPD for miscellaneous professional services GPO.
Accounting, auditing, and bookkeeping services	CPI for personal financial and legal services fees.
Other	IPD for miscellaneous professional services gross output.
Government enterprises:	
Postal services	PPI's for eight types of services.
Pension insurance	BEA earnings and expense index for life insurance.
Deposit insurance for credit unions	No price change assumed.
Deposit insurance for commercial banks	IPD for deposit insurance.
Imported services:	
Rail freight transportation	PPI for railroad freight.
Water transportation n.e.c	IPD for imports of passenger water transportation services.
Gas utilities	Prices of imported natural gas from DOE.
Miscellaneous repair	Average annual earnings from BLS.
Tire retreading	PPI for tires and innertubes.

1. For this table, services consist of the primary outputs of (1) private businesses in the agricultural services, transportation and public utilities, trade, finance, insurance, and real estate, and services industries as defined by the 1972 Standard Industrial Classification, and (2) similar services provided by government enterprises. Prices for imported services are shown separately at the end of the table if they differ from prices used for corresponding domestic services.

2. Sources of price indexes for gross output IPD's, except for business services and for miscellaneous professional services, are shown in table 3. The IPD's for the gross output for these two industries were estimated from the IPD's for GPO for these industries and from information on inputs from the input-output tables.

BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
CPI	Consumer Price Index
GPO	Gross product originating
IPD	Implicit price deflator
PCE	Personal consumption expenditures
PPI	Producer Price Index

Gross output.—New and improved estimates of gross output were developed for the 51 industries (except farms and nonfarm housing services) for which the revised constant-dollar GPO estimates are prepared using the double-deflation method. These estimates primarily reflect the use of information based on BEA's 1977 and forthcoming 1982 benchmark I-O tables, the preparation of estimates at greater levels of detail, and the use of improved extrapolator series.

Table 3 provides a summary description of the principal source data used to prepare the estimates. The table shows, for current-dollar gross output, the series used to extrapolate or interpolate the benchmark values. For constant-dollar gross output, it shows the price index used to deflate current-dollar gross output or the quantity indicator used to extrapolate the base-year value.

Among the previously double-deflated industries, the revised estimates for the construction, railroad transportation, and electric, gas, and sanitary industries were improved by preparing the estimates at more detailed levels and by benchmarking the level of the series to estimates of gross output on an SIC industry basis from benchmark I-O tables. For construction, the estimates were benchmarked to the 1982 benchmark I-O table; for the other industries, the estimates also were benchmarked to comparable gross output from the 1977 benchmark I-O table. Previously, the estimates for these industries had not been benchmarked. For the manufacturing industries except petroleum and coal products, the revised estimates were benchmarked to data from the 1987 Census of Manufactures. Previously, the estimates had been benchmarked to data from the 1977 and 1982 censuses. (The gross output for the two other previously double-deflated industries—farms and nonfarm housing services—was not revised as part of the GPO improvement effort; the estimates for these industries are estimated as an integral part of the preparation of the GNP estimates, and revisions to them were not needed.)

For the newly double-deflated industries, new gross output estimates were prepared for nine industries, and improved gross output estimates were prepared for the others (the ones for which the gross output estimates had previously been used in extrapolation). The revised estimates of gross output

for all these industries were benchmarked to the preliminary estimates of gross output on an SIC industry basis from the 1982 benchmark I-O table or to comparable gross output from the 1977 benchmark I-O table or to both. For the gross output estimates that were improved, extrapolator series that provided more complete and consistent coverage were developed.

Input composition.—New and improved estimates of the composition of inputs were prepared for all the double-deflated industries except farms and nonfarm housing services. In the revised estimates, the composition of inputs is more up to date; inputs for 1977–85 largely reflect the composition of purchases in each of those years, and inputs for 1986–88 for most industries reflect the composition in 1985. In addition, the level of detail for service inputs to all industries was greatly expanded for all years. In the previously published estimates, the composition of inputs in 1982 estimated from the 1977 benchmark I-O table was used for all these years, and the services input detail was generally limited to the GPO industry level of detail.

The revised composition for 1977–85 was estimated from I-O tables converted to an SIC industry basis. For 1977, the composition is from the 1977 benchmark table, which is estimated largely from economic census reports on purchased goods and selected services. For 1981–85, the composition is from BEA's annual update tables, in which the composition is estimated using an indirect method. Initial estimates, prepared assuming that both constant-dollar gross output and inputs have had the same rates of change since the 1977 benchmark, are modified so that the sum of the initial estimates of industry inputs equals the directly measured output of these industries. For 1978–80, the composition is derived by interpolating between the 1977 and 1981 estimates.

As noted, the 1985 composition is used for 1986–88 for most industries. The exceptions are the oil and gas extraction, construction, primary metals, machinery except electrical, food and kindred products, petroleum and coal products, and water transportation industries. For these industries, the composition of inputs changed after 1985 to the extent that the use of the 1985 composition resulted in significant errors in the estimates of constant-dollar inputs. Instead, their total constant-dollar inputs for 1986–88 were estimated by assuming no change in the constant-dollar relationship in 1985 between inputs and gross output. In future years, estimates of the composition of inputs for these industries will be incorporated and these assumptions revised.

Input prices.—Improved deflators for intermediate inputs were developed for all the double-deflated industries except farms and nonfarm housing services to incorporate more appropriate prices in greater detail, especially for services inputs, and to incorporate import prices. In the previously published estimates, only about 30 input prices for services were used; these prices were the implicit deflators for GPO, and they reflected only prices of domestic products.

The revised estimates reflect the use of prices for about 100 services inputs. Most of the new prices were prepared in conjunction with the development of the new estimates of gross output. The sources of the new prices of services inputs are shown in table 4.

The import prices were developed from a variety of sources. Import prices for energy commodities are based on estimates prepared by the Commerce Department's Office of Business Analysis for the National Energy Accounts and on Department of Energy prices. Import prices for nonenergy mineral industry commodities are based on price data from the Bureau of Mines. Import prices for most other goods are from the Bureau of Labor Statistics (BLS) import price series. For years before 1981, however, many of the detailed BLS import prices are not available. Estimates for those years primarily reflect rates of change of more aggregate BLS import prices and, where aggregate indexes were not available, the rates of change in corresponding domestic prices based on the producer price indexes were used.

The import share of intermediate goods and services for 1977 was estimated using the 1977 I-O table and assuming that the proportion of imports to total inputs was the same for all industries purchasing that input. For 1981–85, the import shares were estimated by using Census Bureau imports of each type of commodity identified in 1977 and the estimated 1977 distribution of these imports among all industries. For 1978–80, the import share is interpolated; for 1986–88, the 1985 share is used.

Tables

Tables 5 and 6 show current- and constant-dollar estimates of gross national product by industry—gross product originating—for 1977–88. Comparable estimates for earlier years are not available. Thus, the revised estimates are not consistent with estimates for these years that were published in *National Income and Product Accounts of the United States, 1929–82: Statistical Tables*. These revised estimates are subject to further revision; the 1987 and 1988 estimates will be revised in the spring of 1991, and the estimates for all years will be revised following the forthcoming comprehensive GNP revision.

Average annual rates of change in constant-dollar gross product originating and industry shares in current and constant dollars are shown in table 7. Revisions from the previously published estimates are shown for the rates of change in table 8, for the industry shares in table 9, and for constant-dollar gross product originating in table 10.

Table 5.—Gross National Product by Industry

[Billions of dollars]

	Line	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Gross national product	1	1,990.5	2,249.7	2,508.2	2,732.0	3,052.6	3,166.0	3,405.7	3,772.2	4,014.9	4,231.6	4,514.3	4,880.6
Domestic industries (gross domestic product)	2	1,963.1	2,219.1	2,464.4	2,684.4	3,008.5	3,114.8	3,355.9	3,724.8	3,974.1	4,197.2	4,493.8	4,847.3
Private industries	3	1,717.2	1,950.9	2,172.9	2,357.3	2,641.7	2,731.0	2,948.1	3,276.9	3,502.2	3,696.5	3,963.6	4,286.5
Agriculture, forestry, and fisheries	4	58.9	70.1	83.8	77.3	92.0	89.6	74.3	92.9	92.0	93.6	98.3	99.8
Farms	5	50.4	60.3	71.8	65.5	79.8	77.0	59.3	77.6	75.4	75.8	76.8	76.1
Agricultural services, forestry, and fisheries	6	8.5	9.8	11.9	11.7	12.2	12.6	15.0	15.3	16.6	17.8	21.5	23.8
Mining	7	58.2	86.5	72.7	107.3	143.7	132.1	118.4	119.6	114.3	74.9	77.8	88.4
Metal mining	8	1.9	2.2	2.3	2.8	3.9	2.5	2.5	2.2	1.9	1.8	2.1	3.0
Coal mining	9	9.6	10.2	11.4	12.9	13.8	15.1	14.3	14.6	13.9	13.2	12.7	12.7
Oil and gas extraction	10	34.9	59.6	53.1	84.9	120.3	110.2	96.4	96.4	92.4	52.4	56.3	58.2
Nonmetallic minerals, except fuels	11	3.8	4.4	4.8	5.6	5.2	4.5	5.1	6.2	6.1	6.9	5.9	6.6
Construction	12	97.9	115.6	131.4	137.7	138.4	148.9	165.6	171.5	186.6	203.8	216.9	233.6
Manufacturing	13	468.3	518.8	569.8	581.9	643.1	634.6	683.2	773.9	789.5	832.4	872.1	949.6
Durable goods	14	277.7	317.4	345.2	351.9	385.9	362.5	385.6	451.1	458.8	478.1	495.4	530.3
Lumber and wood products	15	15.9	19.0	20.8	18.7	17.1	16.0	20.5	22.8	22.2	24.7	27.9	29.6
Furniture and fixtures	16	6.7	8.0	8.4	8.5	9.2	9.5	10.6	12.4	13.6	14.3	15.3	15.3
Stone, clay, and glass products	17	15.3	18.0	19.6	19.0	19.0	18.2	20.2	22.9	24.8	26.9	28.7	28.3
Primary metal industries	18	33.5	40.6	45.2	44.3	49.8	35.3	30.3	36.3	34.8	39.2	40.1	46.3
Fabricated metal products	19	35.4	40.0	44.8	46.0	49.6	45.3	47.6	55.1	57.8	57.9	59.3	64.0
Machinery, except electrical	20	55.4	62.4	70.6	76.9	86.2	80.0	75.3	85.4	82.7	82.7	84.8	93.1
Electric and electronic equipment	21	39.5	45.6	49.3	53.0	60.2	61.8	67.7	79.9	82.2	83.7	84.9	91.1
Motor vehicles and equipment	22	35.8	38.4	35.8	26.7	31.3	29.5	39.0	49.6	53.7	53.2	53.5	55.1
Other transportation equipment	23	19.0	21.9	25.2	28.2	28.6	32.2	40.1	46.0	48.0	55.0	58.2	59.2
Instruments and related products	24	13.2	15.1	16.5	19.0	22.3	23.6	23.8	26.9	25.8	27.1	27.7	31.5
Miscellaneous manufacturing industries	25	8.0	8.3	8.9	9.6	11.7	11.1	10.3	13.2	13.1	14.3	15.2	16.4
Nondurable goods	26	187.7	201.4	216.5	229.2	257.3	272.1	297.6	320.8	330.8	354.3	376.6	418.3
Food and kindred products	27	42.7	44.8	47.9	52.2	57.9	61.4	64.7	68.6	69.8	70.9	76.7	83.5
Tobacco manufactures	28	5.7	6.5	6.8	7.3	7.9	8.9	11.9	12.8	12.2	14.4	14.5	15.5
Textile mill products	29	14.0	14.2	14.8	15.0	15.9	14.8	16.9	17.4	17.1	19.1	20.0	20.3
Apparel and other textile products	30	14.5	15.4	16.0	17.1	18.7	18.9	20.3	20.7	20.6	21.9	23.4	24.6
Paper and allied products	31	18.0	19.8	22.2	23.1	25.1	24.7	27.8	31.9	33.1	35.5	40.1	43.8
Printing and publishing	32	23.3	26.2	28.8	31.6	35.2	38.4	42.4	47.6	52.5	56.9	59.9	64.4
Chemicals and allied products	33	37.5	39.6	44.1	45.5	53.3	55.3	59.6	62.0	63.8	70.8	77.0	92.1
Petroleum and coal products	34	14.5	15.2	15.1	16.8	19.8	24.4	28.3	33.7	32.2	35.2	33.3	39.5
Rubber and miscellaneous plastic products	35	14.4	16.0	17.4	16.8	19.3	19.3	21.9	24.4	25.9	26.2	28.6	29.4
Leather and leather products	36	3.9	3.4	3.4	3.9	4.3	4.1	3.8	3.6	3.4	2.8	3.1	3.2
Transportation and public utilities	37	178.9	201.6	216.1	240.8	269.6	268.4	284.9	304.9	314.4	334.9	345.9	361.4
Transportation	38	77.0	88.1	98.2	108.8	122.7	110.8	120.5	133.5	137.5	143.0	151.6	163.2
Railroad transportation	39	15.5	17.2	19.8	20.9	21.9	19.0	20.1	22.4	21.7	20.5	20.4	21.1
Local and interurban passenger transit	40	4.4	4.5	5.0	5.4	5.6	6.0	6.6	7.2	7.4	7.9	8.3	9.2
Trucking and warehousing	41	32.3	37.3	41.4	44.0	46.5	46.6	49.9	56.2	58.6	62.5	65.2	69.6
Water transportation	42	4.9	5.4	6.4	7.1	7.7	7.4	7.5	7.8	7.9	8.1	8.9	8.3
Transportation by air	43	13.7	15.5	16.4	18.1	18.5	19.8	22.9	26.1	27.1	29.2	33.2	37.1
Pipelines, except natural gas	44	2.7	3.4	4.5	4.7	5.0	4.9	5.3	4.5	4.8	3.9	4.9	4.3
Transportation services	45	4.1	4.8	5.6	5.8	7.4	7.8	8.3	9.3	10.0	11.8	12.5	13.7
Communication	46	48.8	55.8	59.5	66.6	76.4	85.6	96.0	102.2	109.5	115.9	125.5	129.3
Telephone and telegraph	47	44.0	49.6	53.7	60.2	69.0	77.3	86.8	91.1	98.3	104.4	111.8	114.3
Radio and television broadcasting	48	4.7	5.4	5.9	6.3	7.4	8.3	9.2	11.1	11.2	11.4	13.7	15.0
Electric, gas, and sanitary services	49	53.1	57.9	58.4	65.4	69.5	72.0	68.5	68.7	67.0	56.1	68.8	68.8
Wholesale trade	50	139.9	157.9	179.5	180.9	214.0	229.0	226.5	263.1	268.9	282.6	304.9	326.1
Retail trade	51	193.9	215.5	236.3	245.9	269.1	287.5	306.4	350.8	377.4	408.5	423.9	454.7
Finance, insurance, and real estate	52	286.3	326.3	363.5	400.6	449.3	473.1	536.4	572.8	639.5	696.3	764.9	838.5
Banking	53	31.0	37.9	45.8	51.1	54.4	59.8	68.1	70.6	79.4	80.3	86.4	99.2
Credit agencies other than banks	54	4.7	7.4	7.2	8.5	6.5	5.4	10.6	9.8	11.6	15.7	20.1	21.3
Security and commodity brokers and services	55	5.7	7.1	7.7	9.7	11.4	13.1	20.7	19.3	24.1	30.1	35.7	40.3
Insurance carriers	56	28.5	33.0	34.0	37.0	34.7	29.8	36.5	34.9	40.7	49.3	61.3	68.0
Insurance agents and brokers, and services	57	11.0	12.9	12.9	14.4	15.8	17.0	17.6	20.1	22.4	25.6	29.0	32.2
Real estate	58	198.7	228.0	254.1	281.5	318.7	342.7	374.2	409.1	449.0	478.6	518.3	584.6
Holding and other investment companies	59	.6	.9	.9	1.3	8.1	7.2	8.7	8.5	12.3	16.4	14.1	14.7
Services	60	283.4	309.1	328.7	374.9	422.6	463.6	515.5	590.2	648.1	717.6	792.7	872.5
Hotels and other lodging places	61	12.7	15.4	17.4	18.9	20.4	21.7	24.3	27.0	30.4	32.4	36.3	40.9
Personal services	62	14.2	15.9	17.0	18.8	19.5	21.3	23.1	25.0	29.7	31.9	34.0	36.9
Business services	63	42.1	49.1	59.1	69.8	79.9	90.7	104.8	125.3	145.8	163.6	180.9	200.3
Auto repair, services, and garages	64	14.8	17.5	19.6	21.1	23.1	23.5	26.1	29.2	33.2	36.9	38.6	41.8
Miscellaneous repair services	65	5.8	6.9	7.6	9.2	9.2	9.6	10.5	12.5	12.4	13.7	14.1	15.9
Motion pictures	66	4.2	5.6	5.0	5.0	5.5	6.3	6.6	7.3	9.0	10.5	11.4	11.2
Amusements and recreation services	67	9.8	10.4	11.5	12.4	14.0	15.1	16.8	17.8	19.9	22.1	24.2	24.5
Health services	68	73.6	82.6	93.1	106.1	124.7	142.0	156.1	169.0	184.6	200.3	225.8	248.5
Legal services	69	15.6	17.5	20.1	23.3	25.9	30.6	35.0	41.6	46.3	54.1	59.9	67.4
Educational services	70	12.1	12.1	14.4	16.0	17.5	19.1	21.0	23.5	25.8	27.6	30.0	33.1
Social services and membership organizations	71	28.7	31.3	33.5	36.3	38.4	39.5	42.8	45.7	48.3	51.7	55.2	58.1
Miscellaneous professional services	72	33.8	37.8	39.9	39.6	47.5	48.7	49.9	54.9	63.6	74.4	81.9	89.4
Private households	73	5.9	6.2	6.5	6.6	7.0	7.6	8.2	8.9	9.0	9.1	9.2	9.4
Government and government enterprises	74	247.4	270.3	292.4	322.1	358.7	383.9	418.8	442.5	476.7	501.6	535.9	570.6
Federal	75	89.8	97.6	104.3	114.7	129.3	139.2	148.3	160.0	171.0	173.5	181.0	187.6
Government	76	73.5	81.7	86.9	96.1	107.4	117.0	124.7	132.1	140.2	143.5	150.9	159.3
Government enterprises	77	14.2	15.9	17.6	18.6	21.9	22.2	23.6	27.9	30.8	29.9	30.1	28.3
State and local	78	157.7	172.7	188.0	207.4	229.4	244.7	270.2	282.5	305.7	328.1	354.9	383.0
Government	79	145.0	158.9	173.5	192.2	209.3	226.9	241.9	258.5	278.6	300.3	322.1	346.5
Government enterprises	80	12.7	13.9	14.4	15.3	16.1	17.9	20.5	24.0	27.0	29.8	32.9	36.5
Statistical discrepancy[1]	81	0	−1.9	−1.0	4.0	4.1	−.1	5.2	5.4	−4.8	−1.8	−4.7	−9.6
Rest of the world	82	28.4	30.8	43.8	47.6	52.1	51.2	49.9	47.4	40.7	34.4	30.5	33.3

1. Equals GNP measured as the sum of expenditures less charges against GNP—that is, GNP measured as the sum of costs incurred and profits earned in production.

Table 6.—Gross National Product by Industry in Constant Dollars

[Billions of 1982 dollars]

	Line	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Gross national product	1	2,958.6	3,115.1	3,192.4	3,187.1	3,248.8	3,166.0	3,279.1	3,501.4	3,618.7	3,717.9	3,853.7	4,024.4
Domestic industries (gross domestic product)	2	2,923.2	3,073.0	3,136.6	3,131.7	3,193.6	3,114.8	3,231.2	3,457.5	3,581.9	3,687.4	3,827.2	3,996.3
Private industries	3	2,563.0	2,697.9	2,776.2	2,741.8	2,793.9	2,721.0	2,836.0	3,068.4	3,180.1	3,315.5	3,443.8	3,605.8
Agriculture, forestry, and fisheries	4	73.3	72.6	77.0	76.4	87.4	89.6	76.7	84.2	96.3	103.6	104.4	94.5
Farms	5	62.2	61.0	64.6	64.2	75.7	77.0	61.3	68.5	79.4	84.1	83.4	72.7
Agricultural services, forestry, and fisheries	6	11.1	12.0	12.4	12.2	11.7	12.6	15.4	15.8	16.4	19.5	21.0	21.7
Mining	7	148.5	148.3	142.1	140.5	145.7	132.1	129.9	137.9	139.0	128.3	125.5	127.3
Metal mining	8	2.3	2.6	2.2	2.1	2.9	2.3	2.2	2.5	2.4	2.6	2.3	2.6
Coal mining	9	12.2	11.7	11.9	13.9	14.2	15.1	15.5	16.5	16.4	17.0	17.6	19.1
Oil and gas extraction	10	124.7	127.2	121.7	121.5	123.5	110.2	107.0	112.6	114.1	102.1	100.1	99.5
Nonmetallic minerals, except fuels	11	6.3	6.7	6.3	6.0	5.0	4.5	5.1	6.3	6.1	6.6	5.5	6.2
Construction	12	187.1	206.9	207.4	183.3	158.3	140.9	146.1	159.4	166.3	174.6	175.4	196.9
Manufacturing	13	664.8	695.7	712.2	673.9	678.6	634.6	674.2	752.4	779.2	803.2	848.7	927.6
Durable goods	14	403.3	423.3	433.1	408.5	408.6	362.5	383.8	448.6	471.5	482.7	517.4	583.2
Lumber and wood products	15	19.5	19.3	21.7	21.3	16.5	16.0	18.8	20.9	19.8	21.3	24.2	25.7
Furniture and fixtures	16	9.9	11.1	10.9	10.4	10.2	9.5	10.4	11.6	12.1	12.0	12.8	12.3
Stone, clay, and glass products	17	22.7	23.3	23.5	21.3	20.2	18.2	19.7	21.3	22.2	22.9	24.9	25.2
Primary metal industries	18	47.9	52.8	52.7	48.2	50.6	35.3	28.9	33.4	32.7	32.2	34.6	37.9
Fabricated metal products	19	51.5	53.4	56.0	53.7	53.0	46.3	48.8	54.3	56.2	54.8	58.4	63.2
Machinery, except electrical	20	78.4	80.9	85.6	86.1	89.6	80.0	84.8	103.7	114.2	129.4	140.7	170.5
Electric and electronic equipment	21	50.1	58.3	60.2	63.3	64.9	61.8	64.6	75.3	76.3	74.1	78.3	88.1
Motor vehicles and equipment	22	57.0	58.1	51.6	33.2	34.8	29.5	37.8	47.3	50.3	46.5	46.4	51.7
Other transportation equipment	23	32.3	34.9	34.5	37.4	33.1	33.2	37.6	41.3	42.5	49.8	55.5	60.9
Instruments and related products	24	19.7	20.3	22.4	21.9	23.8	23.6	23.1	25.2	24.2	25.7	26.7	31.5
Miscellaneous manufacturing industries	25	14.4	13.0	12.0	9.7	12.1	11.1	9.5	13.7	13.0	14.0	15.0	16.1
Nondurable goods	26	261.5	271.9	279.0	265.5	269.9	272.1	290.4	303.8	307.7	320.5	332.2	344.3
Food and kindred products	27	51.7	50.6	59.5	59.8	58.9	61.4	62.7	62.1	64.8	65.6	66.5	67.8
Tobacco manufactures	28	9.3	9.9	9.9	9.6	9.9	8.9	8.0	7.8	6.2	7.0	5.6	4.7
Textile mill products	29	17.6	16.6	17.0	14.4	13.8	14.8	16.2	16.0	13.6	17.0	17.3	16.8
Apparel and other textile products	30	20.8	21.5	21.3	21.1	20.3	18.9	20.1	20.4	20.1	21.0	22.7	23.2
Paper and allied products	31	27.5	28.9	28.7	25.8	25.5	26.7	29.0	29.5	30.2	31.6	33.8	34.9
Printing and publishing	32	35.2	36.2	37.1	37.0	38.6	38.4	39.6	40.8	42.5	43.1	43.6	45.5
Chemicals and allied products	33	53.0	55.1	56.7	58.0	54.0	55.3	59.7	59.4	59.1	64.6	68.2	74.2
Petroleum and coal products	34	23.5	22.7	24.9	22.9	21.3	24.4	29.8	29.5	29.4	41.1	42.6	44.5
Rubber and miscellaneous plastic products	35	17.9	19.0	19.7	18.6	20.8	19.3	21.6	24.7	25.6	26.7	29.3	29.8
Leather and leather products	36	4.8	4.9	4.2	4.3	4.4	4.1	3.8	3.6	3.2	2.7	2.8	2.9
Transportation and public utilities	37	275.2	284.0	291.3	294.9	293.9	288.4	307.7	326.0	331.4	342.4	373.6	392.0
Transportation	38	111.7	119.8	124.4	117.1	110.6	110.8	124.0	132.3	132.4	138.0	147.4	150.0
Railroad transportation	39	19.2	21.3	22.2	22.5	21.9	19.0	20.9	23.6	23.5	23.1	23.4	26.5
Local and interurban passenger transit	40	6.1	5.8	6.5	6.4	6.1	6.0	6.4	6.7	6.5	6.2	6.2	6.1
Trucking and warehousing	41	32.1	35.2	35.4	29.9	26.8	26.6	33.4	36.1	36.9	38.1	39.3	38.5
Water transportation	42	8.2	8.5	8.5	8.2	6.3	7.4	7.6	8.4	8.8	8.6	8.7	8.7
Transportation by air	43	15.0	18.1	19.4	17.3	16.8	19.8	22.8	23.4	23.2	23.4	31.5	31.1
Pipelines, except natural gas	44	5.4	4.4	3.5	3.3	3.3	4.9	4.7	4.9	4.7	5.2	4.6	5.4
Transportation services	45	5.7	6.5	7.0	7.2	7.5	7.5	8.3	9.2	10.0	10.4	10.9	11.6
Communication	46	60.1	66.4	72.0	79.5	84.0	85.6	91.7	89.5	89.8	92.5	104.4	107.6
Telephone and telegraph	47	52.3	58.4	63.9	71.4	75.7	77.3	83.2	80.8	81.7	85.0	95.1	98.0
Radio and television broadcasting	48	7.8	8.0	8.1	8.1	8.3	8.3	8.4	8.7	8.1	7.5	9.3	9.7
Electric, gas, and sanitary services	49	99.4	97.8	95.0	97.3	99.3	92.0	92.1	104.3	109.2	111.9	121.7	134.3
Wholesale trade	50	163.3	183.8	196.7	200.1	212.7	210.8	222.2	254.9	267.1	284.9	289.4	296.8
Retail trade	51	270.8	284.8	291.3	281.7	286.4	287.5	307.8	334.8	354.4	377.5	378.8	397.2
Finance, insurance, and real estate	52	417.9	442.8	461.1	468.9	476.1	475.1	492.5	509.8	538.3	535.6	564.7	583.7
Banking	53	49.8	51.3	54.2	56.7	58.8	59.8	60.1	60.6	61.5	62.5	62.8	62.4
Credit agencies other than banks	54	4.4	4.8	5.1	5.2	5.4	5.4	6.0	6.6	7.0	7.2	8.3	8.4
Security and commodity brokers, and services	55	9.0	10.2	10.1	11.3	12.7	13.1	18.6	17.0	18.8	23.1	29.9	33.6
Insurance carriers	56	33.8	34.8	35.4	38.7	35.4	29.8	33.2	35.9	39.5	36.0	38.8	41.1
Insurance agents and brokers, and services	57	15.3	15.3	15.3	15.9	16.3	17.0	16.3	17.5	18.0	17.8	18.7	18.8
Real estate	58	300.7	320.7	334.8	335.8	340.9	342.7	351.4	364.1	374.5	378.6	395.3	408.0
Holding and other investment companies	59	5.6	5.8	6.2	6.3	6.5	7.2	7.4	8.2	9.0	9.8	10.9	11.5
Services	60	398.6	423.5	436.9	458.9	463.0	463.6	488.4	499.7	538.6	565.8	591.4	623.9
Hotels and other lodging places	61	25.0	25.8	24.4	22.5	21.7	21.7	23.6	24.5	26.0	26.6	28.4	30.1
Personal services	62	22.4	22.8	22.1	22.3	21.1	21.3	21.7	22.2	25.2	25.9	26.4	27.2
Business services	63	65.0	71.8	78.8	83.9	88.5	90.7	97.5	111.0	120.8	129.8	139.7	147.2
Auto repair, services, and garages	64	22.2	24.8	25.3	24.8	25.2	25.5	24.5	26.2	28.7	29.0	29.9	29.5
Miscellaneous repair services	65	8.3	9.1	9.3	10.6	9.9	9.6	10.5	11.8	10.7	11.2	11.1	12.0
Motion pictures	66	6.1	7.3	6.1	5.7	5.8	6.3	6.2	6.3	7.5	8.6	8.1	8.4
Amusements and recreation services	67	11.6	11.8	12.6	13.4	14.8	15.3	16.1	16.3	17.5	18.4	19.6	21.1
Health services	68	120.5	123.7	127.3	133.9	138.1	142.0	145.2	145.0	148.6	150.5	158.7	159.9
Legal services	69	26.9	28.1	30.0	30.6	30.1	30.6	30.1	32.5	33.5	36.7	36.8	39.6
Educational services	70	19.0	19.6	18.8	18.9	18.2	19.1	19.9	21.1	22.1	22.4	23.1	23.8
Social services and membership organizations	71	27.0	28.6	29.4	30.2	30.5	30.5	31.1	32.3	33.3	34.7	35.9	38.0
Miscellaneous professional services	72	37.0	40.0	45.0	47.0	51.3	45.7	47.7	52.1	56.0	63.5	66.0	68.2
Private households	73	8.7	8.5	7.8	7.4	7.3	7.6	8.1	8.0	8.8	8.8	8.8	8.8
Government and government enterprises	74	363.8	377.6	378.5	381.8	385.4	383.9	387.3	391.9	400.8	417.9	414.8	422.2
Federal	75	134.2	136.7	133.9	138.3	139.5	139.2	141.7	143.8	146.2	147.1	148.6	150.8
Government	76	112.7	113.9	113.0	114.4	115.8	117.0	119.0	120.5	122.9	122.6	123.6	125.2
Government enterprises	77	21.5	22.9	22.9	23.8	23.7	22.2	22.7	23.3	23.9	24.4	24.9	25.5
State and local	78	228.8	234.9	240.5	244.5	245.8	244.7	245.5	248.1	254.3	260.8	266.2	271.4
Government	79	213.3	219.0	223.5	226.8	228.1	226.9	227.3	229.5	235.0	240.8	246.0	250.9
Government enterprises	80	15.3	16.0	17.0	17.8	17.7	17.9	18.3	18.7	19.3	20.0	20.2	20.5
Statistical discrepancy [1]	81	.1	−2.8	−1.0	5.5	4.4	−.1	5.0	5.0	−4.3	−1.6	−4.1	−8.0
Residual [2]	82	−4.9	6.1	−14.5	0	9.9	0	.5	−7.8	−14.4	−34.5	−27.4	−27.7
Rest of the world	83	37.4	42.2	55.7	55.5	55.2	51.2	47.9	42.9	36.9	30.5	26.6	28.1

1. Equals the statistical discrepancy in current dollars (see footnote 1 of table 5) divided by the implicit price deflator for gross domestic business product.
2. Equals GNP in constant dollars measured as the sum of expenditures less the statistical discrepancy in constant dollars and GNP in constant dollars measured as the sum of gross product originating by industry.

Table 7.—Gross National Product by Industry: Average Annual Rates of Change and Percentages of Total Gross National Product for Selected Years

[Percent]

	Line	Average annual rates of change, 1982 dollars			Percentage of gross national product				
					Current dollars			1982 dollars[1]	
		1977-88	1977-82	1982-88	1977	1982	1988	1977	1988
Gross national product	1	2.8	1.4	4.1	100.0	100.0	100.0	100.0	100.0
Domestic industries (gross domestic product)	2	2.9	1.3	4.2	96.7	98.4	99.3	96.7	99.3
Private industries	3	3.2	1.1	4.8	86.3	86.3	87.2	86.6	89.7
Agriculture, forestry, and fisheries	4	2.3	4.1	.9	3.0	2.8	2.0	2.5	2.3
Farms	5	1.4	4.4	-1.0	2.5	2.4	1.6	2.1	1.9
Agricultural services, forestry, and fisheries	6	6.3	2.6	9.5	.5	.4	.5	.4	.5
Mining	7	-1.3	-1.9	-.6	2.5	4.2	3.6	4.9	3.3
Metal mining	8	1.1	0	2.1	.1	.1	.1	.1	.1
Coal mining	9	4.2	4.4	4.0	.5	.5	.3	.4	.5
Oil and gas extraction	10	-2.0	-2.4	-1.7	1.5	3.5	1.2	4.3	2.5
Nonmetallic minerals, except fuels	11	-.1	-.6	1.5	.2	.1	.1	.1	.2
Construction	12	1.3	-2.2	3.9	4.9	4.5	4.8	5.3	4.4
Manufacturing	13	3.1	-.9	4.5	23.4	20.0	19.4	22.5	23.0
Durable goods	14	3.4	-2.1	8.2	14.0	11.4	10.9	13.6	14.5
Lumber and wood products	15	2.5	-3.9	8.2	.8	.5	.6	.7	.6
Furniture and fixtures	16	2.0	-.8	4.4	.5	.3	.3	.3	.3
Stone, clay, and glass products	17	1.0	-4.3	5.6	.8	.6	.6	.8	.6
Primary metal industries	18	-2.1	-5.9	1.2	1.7	1.1	1.0	1.6	.9
Fabricated metal products	19	1.9	-2.1	5.3	1.8	1.5	1.3	1.7	1.6
Machinery, except electrical	20	2.3	.4	13.4	2.8	2.5	1.9	2.6	4.2
Electric and electronic equipment	21	5.3	4.3	6.1	2.0	2.0	1.9	1.7	2.2
Motor vehicles and equipment	22	-.9	-12.3	9.2	1.8	.9	1.1	1.9	1.3
Other transportation equipment	23	5.9	-.1	11.2	1.0	1.0	1.2	1.1	1.5
Instruments and related products	24	4.4	2.8	5.7	.7	.7	.6	.7	.8
Miscellaneous manufacturing industries	25	1.0	-5.1	6.4	.4	.4	.3	.5	.4
Nondurable goods	26	2.3	.8	4.0	9.4	8.6	8.6	8.8	8.8
Food and kindred products	27	2.5	3.5	1.7	2.1	1.9	1.7	1.7	1.7
Tobacco manufactures	28	-6.2	-1.3	-10.1	.3	.3	.1	.3	.1
Textile mill products	29	-.4	-3.4	2.1	.3	.3	.4	.4	.4
Apparel and other textile products	30	1.0	-1.9	3.5	.5	.5	.5	.7	.6
Paper and allied products	31	2.2	-.6	4.6	.9	.8	.9	.9	.9
Printing and publishing	32	2.4	1.8	2.9	1.3	1.2	1.3	1.2	1.1
Chemicals and allied products	33	3.1	.9	5.0	1.9	1.7	1.9	1.8	1.8
Petroleum and coal products	34	0.0	.8	10.6	.3	.8	.2	.8	1.1
Rubber and miscellaneous plastic products	35	4.7	1.5	7.5	.5	.6	.6	.6	.7
Leather and leather products	36	-4.5	-9.1	-5.6	.2	.1	.1	.2	.1
Transportation and public utilities	37	3.4	1.2	5.2	9.0	9.1	9.0	9.2	9.7
Transportation	38	2.7	-.2	5.2	3.9	3.5	3.3	3.8	3.7
Railroad transportation	39	3.0	-1.2	5.7	.8	.6	.4	.6	.7
Local and interurban passenger transit	40	0	-2.3	2	.2	.2	.2	.2	.2
Trucking and warehousing	41	2.1	-2.2	5.8	1.6	1.5	1.4	1.8	1.6
Water transportation	42	-7.0	-2.0	-10.9	.2	.3	.2	.3	.1
Transportation by air	43	6.9	4.8	8.6	.7	.6	.8	.5	.8
Pipelines, except natural gas	44	0	-1.9	1.6	.1	.2	.1	.2	.1
Transportation services	45	5.7	6.1	6.8	.2	.2	.3	.2	.3
Communication	46	5.4	7.3	3.9	2.5	2.7	2.6	2.0	2.7
Telephone and telegraph	47	5.9	8.1	4.0	2.2	2.4	2.3	1.8	2.4
Radio and television broadcasting	48	2.0	1.3	2.6	.2	.3	.3	.3	.2
Electric, gas, and sanitary services	49	2.3	-1.5	6.5	2.7	2.9	3.0	3.4	3.3
Wholesale trade	50	5.6	6.1	5.2	7.0	6.9	6.7	5.5	7.1
Retail trade	51	3.6	1.2	5.5	9.7	9.1	9.3	9.1	9.9
Finance, insurance, and real estate	52	3.1	2.6	3.5	14.1	15.0	17.0	14.3	14.5
Banking	53	2.2	4.1	.7	1.6	1.9	2.0	1.7	1.6
Credit agencies other than banks	54	6.1	4.2	7.6	.2	.2	.4	.1	.2
Security and commodity brokers, and services	55	12.7	7.8	17.0	.3	.4	.8	.3	.8
Insurance carriers	56	1.8	-2.5	5.5	1.4	.9	1.4	1.1	1.0
Insurance agents and brokers, and services	57	1.9	2.1	1.7	.4	.5	.7	.5	.5
Real estate	58	2.8	2.6	2.9	10.0	10.8	11.4	10.2	10.1
Holding and other investment companies	59	6.8	5.2	8.1	0	.2	.3	.2	.3
Services	60	4.8	3.9	4.8	12.7	14.6	17.9	13.5	15.3
Hotels and other lodging places	61	1.7	-2.8	5.6	.6	.7	.8	.8	.7
Personal services	62	1.8	-1.0	4.2	.7	.7	.8	.8	.7
Business services	63	7.7	6.9	8.4	2.1	2.9	4.1	2.2	3.7
Auto repair, services, and garages	64	2.6	1.1	3.9	.7	.7	.9	.8	.7
Miscellaneous repair services	65	3.5	3.2	3.8	.3	.3	.3	.3	.3
Motion pictures	66	3.0	.6	4.9	.2	.2	.2	.2	.2
Amusement and recreation services	67	5.6	5.4	5.7	.5	.5	.6	.4	.5
Health services	68	2.6	3.2	2.0	3.7	4.5	5.1	4.1	4.0
Legal services	69	2.6	2.6	4.4	.8	1.0	1.4	.9	1.0
Educational services	70	2.1	.1	3.7	.6	.6	.7	.6	.6
Social services and membership organizations	71	3.2	2.5	3.7	.9	1.0	1.0	.9	.9
Miscellaneous professional services	72	3.7	4.3	6.9	1.2	1.4	1.8	1.3	1.7
Private households	73	.1	-2.7	2.5	.3	.2	.2	.3	.2
Government and government enterprises	74	1.4	1.1	1.6	12.4	12.1	11.9	12.3	10.5
Federal	75	1.1	.7	1.3	4.5	4.4	3.8	4.5	3.7
Government	76	1.0	.8	1.1	3.8	3.7	3.3	3.8	3.1
Government enterprises	77	1.6	.6	2.3	.7	.7	.6	.7	.6
State and local	78	1.6	1.4	1.7	7.9	7.7	7.8	7.7	6.7
Government	79	1.3	1.2	1.7	7.3	7.2	7.1	7.3	6.1
Government enterprises	80	2.8	2.9	2.3	.6	.6	.7	.5	.5
Statistical discrepancy[2]	81				0	0	-.2	0	-.2
Residual[2]	82							-.2	-.7
Rest of the world	83	-2.6	6.5	-9.5	2.3	1.6	.7	2.3	.7

1. Current and constant-dollar estimates are the same in 1982, the base period.
2. See footnotes 1 and 2 of table 6.

Table 8.—Revisions in Average Annual Rates of Change of Gross National Product by Industry in Constant Dollars for Selected Years

[Percent]

	Line	1977-87			1977-82			1982-87			1979-85		
		Previously published	Revised	Revision	Previously published	Revised	Revision	Previously published	Revised	Revision	Previously published	Revised	Revision
Gross national product	1	2.7	2.7	0	1.4	1.4	0	4.0	4.0	0	2.1	2.1	0
Domestic industries (gross domestic product)	2	2.7	2.7	0	1.3	1.3	0	4.2	4.2	0	2.2	2.2	0
Private industries	3	3.0	3.0	.1	1.3	1.3	0	4.5	4.7	.1	2.3	2.4	.1
Agriculture, forestry, and fisheries	4	3.8	3.6	.6	4.6	4.1	−.5	3.4	3.1	1.7	3.5	3.7	.2
Mining	5	−.7	−1.5	−.8	.9	−1.9	−2.8	−2.3	−1.0	1.3	0	−.4	−.4
Construction	6	.6	1.1	.5	−3.1	−2.2	.9	4.9	4.9	0	−.2	−.1	.7
Manufacturing	7	2.7	2.5	−.2	−.3	−.9	−.6	5.8	6.0	.2	2.9	1.5	−1.5
Durable goods	8	3.1	2.5	−.6	−1.3	−2.1	−.9	7.7	7.4	−.3	2.6	1.4	−1.2
Nondurable goods	9	2.0	2.4	.4	1.8	.8	−1.0	2.9	4.1	1.2	1.2	1.6	.4
Transportation and public utilities	10	2.7	3.3	.6	1.4	1.1	−.2	3.9	5.3	1.4	1.8	2.2	.4
Transportation	11	.8	2.8	2.1	−2.6	−.2	2.4	4.3	5.9	1.7	−1.5	1.0	2.5
Communication	12	5.7	5.7	0	6.7	7.3	.6	4.7	4.1	−.6	4.6	3.8	−.8
Electric, gas, and sanitary services	13	2.8	2.0	−.8	2.7	−1.5	−4.2	2.9	5.8	2.9	4.8	2.3	−2.5
Wholesale trade	14	3.9	3.9	2.3	1.4	6.1	4.8	6.9	5.7	−1.2	3.6	5.2	1.6
Retail trade	15	3.0	3.2	.2	.9	1.2	.3	5.1	5.2	.1	2.5	3.3	.8
Finance, insurance, and real estate	16	3.0	3.1	.1	2.6	2.6	0	3.3	3.5	.2	2.1	2.3	.1
Services	17	4.6	4.0	−.6	3.5	3.0	−.6	6.7	6.0	−.7	4.1	3.5	−.6
Government and government enterprises	18	1.4	1.3	−.1	1.1	1.1	0	1.6	1.6	0	1.1	1.0	−.1
Statistical discrepancy [1]	19												
Residual [1]	20												
Rest of the world	21	−3.7	−3.4	.3	6.5	6.5	0	−12.9	−12.3	.5	−6.6	−6.6	0

1. See footnotes 1 and 2 of table 6.

Table 9.—Revisions in Gross National Product by Industry as Percentage of Total Gross National Product in Constant Dollars for Selected Years

[Percent]

	Line	1977			1979			1985			1987		
		Previously published	Revised	Revision	Previously published	Revised	Revision	Previously published	Revised	Revision	Previously published	Revised	Revision
Gross national product	1	100.0	100.0	0	100.0	100.0	0	100.0	100.0	0	100.0	100.0	0
Domestic industries (gross domestic product)	2	98.7	98.7	0	98.3	98.3	0	99.0	99.0	0	99.3	99.3	0
Private industries	3	84.6	84.6	0	86.8	87.0	.2	88.0	88.4	.4	88.5	89.4	.8
Agriculture, forestry, and fisheries	4	2.4	2.5	.1	2.0	2.4	0	2.6	2.6	0	2.5	2.7	.2
Mining	5	4.3	4.9	.6	4.1	4.5	.4	3.6	3.8	.3	3.1	3.3	.2
Construction	6	5.6	5.3	−.3	5.4	5.1	−.2	4.6	4.6	0	4.6	4.6	0
Manufacturing	7	21.8	22.5	.7	21.8	22.3	.5	21.7	21.5	−.3	21.8	22.0	.2
Durable goods	8	13.1	13.6	.5	13.3	13.6	.3	13.6	13.0	−.6	13.7	13.4	−.3
Nondurable goods	9	8.8	8.8	0	8.6	8.7	.1	8.1	8.5	.4	8.2	8.6	.4
Transportation and public utilities	10	9.1	9.2	.1	9.2	9.1	−.1	9.0	9.2	.2	9.1	9.7	.6
Transportation	11	4.3	3.8	−.5	4.3	3.9	−.4	3.5	3.7	.2	3.5	3.8	.3
Communication	12	2.1	2.0	−.1	2.3	2.3	0	2.6	2.5	−.1	2.8	2.7	−.1
Electric, gas, and sanitary services	13	2.7	3.4	.7	2.6	3.0	.4	2.9	3.0	.1	2.8	3.2	.4
Wholesale trade	14	6.9	5.5	−1.4	6.8	6.2	−.6	7.4	7.4	0	7.6	7.5	−.1
Retail trade	15	9.3	9.2	−.2	9.2	9.2	−.1	9.4	9.8	.4	9.6	9.6	0
Finance, insurance, and real estate	16	14.1	14.1	0	14.4	14.4	0	14.5	14.6	.1	14.5	14.7	.2
Services	17	13.1	13.6	.4	13.5	13.7	.2	15.1	14.9	−.2	15.9	15.3	−.6
Government and government enterprises	18	12.3	12.3	0	11.8	11.8	0	11.1	11.1	0	10.5	10.5	0
Statistical discrepancy [1]	19	0	0	0	0	0	0	−.1	−.1	0	−.2	−.1	.1
Residual [1]	20	−.1	−.2	−.1	−.3	−.5	−.2	.1	−.4	−.5	.1	−.7	−.8
Rest of the world	21	1.3	1.3	0	1.7	1.7	0	1.0	1.0	0	.7	.7	0

1. See footnotes 1 and 2 of table 6.

Table 10.—Revisions in Gross National Product by Industry in Constant Dollars for Selected Years

(Billions of 1982 dollars)

	Line	1977			1979			1985			1987		
		Previously published	Revised	Revision	Previously published	Revised	Revision	Previously published	Revised	Revision	Previously published	Revised	Revision
Gross national product	1	2,958.6	2,958.6	0	3,192.4	3,192.4	0	3,618.7	3,618.7	0	3,847.0	3,853.7	6.7
Domestic industries (gross domestic product)	2	2,921.3	2,928.2	8	3,136.6	3,136.6	8	3,581.9	3,581.9	0	3,824.4	3,827.2	6.8
Private industries	3	2,561.7	2,563.0	1.3	2,778.9	2,776.2	5.3	3,185.3	3,208.3	17.0	3,408.5	3,443.8	35.3
Agriculture, forestry, and fisheries	4	73.6	73.3	1.7	76.1	77.0	.9	93.4	95.4	2.0	96.1	104.4	8.3
Farms	5	62.2	62.2	0	64.6	64.6	0	79.4	79.4	0	82.5	83.4	.9
Agricultural services, forestry, and fisheries	6	9.4	11.1	1.7	11.5	12.4	.9	14.0	16.0	2.0	13.6	21.0	7.4
Mining	7	134.2	148.5	19.3	130.0	142.2	12.3	120.1	139.0	8.9	107.5	125.5	8.8
Metal mining	8	3.4	2.3	−1.1	3.6	2.2	−1.4	2.4	2.4	0	2.7	2.3	−.4
Coal mining	9	12.6	12.2	−.4	14.1	11.9	−2.2	18.0	18.4	.4	16.6	17.6	1.0
Oil and gas extraction	10	108.3	134.7	19.4	106.9	121.7	14.8	106.2	114.1	7.9	92.7	100.1	7.4
Nonmetallic minerals, except fuels	11	4.9	6.3	1.4	5.4	6.3	.9	5.6	6.1	.5	5.5	5.5	0
Construction	12	165.1	157.3	−8.0	172.5	167.6	−6.1	168.4	166.9	.9	175.5	175.4	−.4
Manufacturing	13	646.0	664.8	19.8	697.1	712.2	15.1	786.8	779.2	−7.6	839.5	849.7	10.2
Durable goods	14	386.2	403.3	17.1	423.5	433.1	9.6	493.7	471.5	−22.2	525.2	517.4	−7.8
Lumber and wood products	15	18.9	19.5	.6	21.0	21.7	.7	20.1	19.8	−.3	23.5	24.2	.7
Furniture and fixtures	16	9.8	9.9	.1	10.8	10.9	.1	12.2	12.1	−.1	12.5	12.8	.3
Stone, clay, and glass products	17	21.2	22.7	1.5	22.5	22.5	.1	22.6	22.2	−.4	23.1	24.9	1.8
Primary metal industries	18	46.1	47.9	1.8	48.2	52.7	2.9	54.2	52.7	−1.5	54.3	54.6	.3
Fabricated metal products	19	50.3	51.5	1.3	54.9	56.0	1.1	56.8	56.2	−.6	58.5	58.4	−.1
Machinery, except electrical	20	73.3	78.4	5.1	83.8	85.6	1.8	134.5	124.2	−10.3	160.7	140.7	−20.0
Electric and electronic equipment	21	49.5	50.1	.6	60.2	60.2	0	79.7	74.3	−5.4	82.5	78.3	−4.2
Motor vehicles and equipment	22	52.3	57.0	4.7	47.9	51.6	3.7	50.9	50.3	−.6	40.3	46.4	6.1
Other transportation equipment	23	32.3	32.3	0	37.2	36.5	−.7	43.8	42.5	−1.3	50.2	55.5	5.3
Instruments and related products	24	19.0	19.7	.7	22.5	22.4	−.1	24.7	24.2	−.5	25.3	26.7	1.4
Miscellaneous manufacturing industries	25	13.3	14.4	1.1	12.1	12.0	−.1	14.3	13.0	−1.3	14.1	15.0	.9
Nondurable goods	26	258.9	261.5	2.6	273.5	279.0	5.5	293.0	307.7	14.7	314.3	332.2	17.9
Food and kindred products	27	51.2	51.7	.5	54.9	59.5	4.6	63.1	64.8	1.7	63.7	66.5	2.8
Tobacco manufactures	28	9.6	9.5	−.1	9.9	9.9	0	6.9	6.2	−.7	7.2	5.6	−1.6
Textile mill products	29	15.8	17.6	1.8	16.1	17.0	.9	16.3	15.8	−.5	17.8	17.3	−.5
Apparel and other textile products	30	18.6	20.8	2.2	19.6	21.3	1.7	19.9	20.1	.2	21.4	22.7	1.3
Paper and allied products	31	26.1	27.5	1.4	27.1	28.7	1.6	30.2	30.2	0	33.0	33.8	.8
Printing and publishing	32	33.0	33.2	.2	37.6	37.1	−.5	43.0	42.5	−.5	42.6	43.6	1.0
Chemicals and allied products	33	50.5	53.0	2.5	55.4	56.7	1.3	59.1	59.1	0	68.8	68.2	−.6
Petroleum and coal products	34	28.9	23.5	−5.4	28.9	24.9	−4.0	24.9	39.4	14.5	26.6	42.6	16.0
Rubber and miscellaneous plastic products	35	18.4	17.9	−.5	20.0	19.7	−.3	26.2	26.6	.4	29.8	29.3	−.5
Leather and leather products	36	4.7	4.8	.1	4.9	4.8	−.1	3.4	3.2	−.2	3.3	2.8	−.5
Transportation and public utilities	37	268.5	272.2	2.7	293.4	291.3	−2.1	326.8	331.4	5.4	349.5	373.6	24.1
Transportation	38	126.2	111.7	−14.5	137.7	124.4	−13.3	125.4	132.4	7.0	126.0	147.4	11.4
Railroad transportation	39	26.9	19.2	−7.7	32.8	22.2	−5.6	19.3	23.5	4.2	16.9	25.4	8.5
Local and interurban passenger transit	40	7.5	6.1	−1.4	7.7	6.5	−1.2	6.3	6.3	0	6.6	6.2	−.4
Trucking and warehousing	41	53.5	52.1	−1.4	56.6	55.4	−1.2	52.6	60.9	8.3	60.2	65.3	5.1
Water transportation	42	7.8	8.2	.6	8.3	8.5	.2	7.8	3.5	−4.3	7.9	3.7	−4.2
Transportation by air	43	20.3	13.0	−5.3	24.9	19.4	−3.5	24.4	23.2	−1.2	28.4	31.5	3.1
Pipelines, except natural gas	44	4.8	5.4	.6	5.3	5.5	.2	4.9	4.7	−.2	5.1	4.6	−.5
Transportation services	45	5.7	5.7	0	7.0	7.0	0	10.0	10.0	0	10.9	10.9	0
Communication	46	61.9	60.1	−1.8	72.5	72.0	−.5	85.2	80.2	−5.4	107.6	104.4	−3.2
Telephone and telegraph	47	55.0	52.3	−2.7	65.1	63.9	−1.2	85.8	81.7	−4.1	97.6	95.1	−2.5
Radio and television broadcasting	48	6.9	7.8	.9	7.3	8.1	.8	9.4	8.1	−1.3	10.1	9.3	−.8
Electric, gas, and sanitary services	49	80.4	99.4	19.0	83.3	95.0	11.7	105.3	109.2	3.9	105.9	121.7	15.8
Wholesale trade	50	284.1	163.2	−40.9	217.3	196.7	−20.6	288.5	267.1	−1.4	291.7	289.4	−2.3
Retail trade	51	276.1	270.5	−4.6	294.4	291.3	−3.1	341.8	354.4	12.6	368.3	370.0	1.7
Finance, insurance, and real estate	52	417.9	417.9	.2	489.2	481.1	1.9	584.3	588.3	4.0	669.4	664.7	4.3
Banking	53	49.1	49.0	−.1	54.2	54.2	0	61.9	61.5	−.4	63.2	62.8	−.4
Credit agencies other than banks	54	4.4	4.4	0	5.1	5.1	0	7.0	7.0	0	8.3	8.3	0
Security and commodity brokers, and services	55	8.6	9.0	.4	9.4	10.1	.7	16.8	18.8	1.9	21.3	29.9	8.6
Insurance carriers	56	27.5	33.9	6.4	38.6	35.4	6.8	33.5	39.5	6.0	37.8	38.8	1.0
Insurance agents and brokers, and services	57	17.3	15.3	−2.0	17.9	15.3	−2.6	20.0	18.0	−2.0	23.9	18.7	−5.2
Real estate	58	309.3	309.1	−4.6	357.8	354.8	−3.0	376.0	374.3	−1.5	394.8	395.3	.5
Holding and other investment companies	59	5.6	5.6	0	6.2	6.2	0	9.0	9.0	0	10.9	10.9	0
Services	60	388.4	399.6	11.2	429.8	436.9	7.1	546.4	538.6	−7.8	698.8	691.4	−19.4
Hotels and other lodging places	61	21.2	25.0	3.8	23.1	24.4	1.3	23.5	26.0	2.5	24.3	28.4	4.1
Personal services	62	22.4	22.4	0	23.3	22.1	−1.2	23.4	23.2	−.2	27.1	26.4	−.7
Business services	63	65.1	65.0	−.1	72.8	78.8	0	120.8	120.8	0	139.7	139.7	0
Auto repair, services, and garages	64	22.2	22.2	0	25.0	25.3	.3	30.1	28.7	−1.4	32.9	28.9	−4.0
Miscellaneous repair services	65	7.9	8.2	.3	8.9	9.3	.4	10.3	10.7	.4	10.2	11.1	.9
Motion pictures	66	6.1	6.1	0	6.1	6.1	0	7.5	7.5	0	7.6	8.1	.5
Amusement and recreation services	67	13.0	11.6	−1.4	13.6	12.6	−1.0	17.9	17.5	−.4	20.3	19.6	−.7
Health services	68	134.6	130.5	3.9	123.5	127.3	3.8	158.8	148.6	−10.3	176.9	158.7	−18.2
Legal services	69	26.4	26.9	.5	28.6	30.0	1.4	35.0	33.5	−1.5	37.9	36.8	−1.1
Educational services	70	16.8	19.0	2.2	17.6	18.8	1.2	21.5	22.1	.6	22.4	23.1	.7
Social services and membership organizations	71	27.0	27.0	0	29.4	29.4	0	33.3	33.3	0	35.9	35.9	0
Miscellaneous professional services	72	37.0	37.0	0	43.0	43.0	0	53.6	56.0	2.4	66.1	66.0	−.7
Private households	73	8.7	8.7	0	7.8	7.8	0	8.8	8.8	0	8.8	8.8	0
Government and government enterprises	74	362.9	363.8	.1	376.2	376.3	.3	408.8	408.5	−.3	415.7	414.8	−.9
Federal	75	134.2	134.2	0	135.9	135.9	0	146.6	146.2	−.3	148.8	148.6	−.2
Government	76	112.7	112.7	0	113.0	113.0	0	122.3	122.3	0	123.5	123.6	.1
Government enterprises	77	21.5	21.5	0	22.9	22.9	0	24.1	23.9	−.2	25.3	24.9	−.4
State and local	78	228.7	228.6	−.1	240.2	240.5	.3	254.4	254.3	−.1	266.9	266.2	−.7
Government	79	213.3	213.3	0	223.5	223.5	0	235.0	235.0	0	246.4	246.0	−.4
Government enterprises	80	15.4	15.5	.1	16.7	17.0	.3	19.3	19.3	0	20.4	20.2	−.2
Statistical discrepancy [1]	81	.1	.1	0	−1.4	−1.4	0	−4.3	−4.3	0	−7.0	−4.1	2.9
Residual [1]	82	−3.4	−4.9	−1.5	−9.0	−14.5	−5.5	2.3	−14.4	−16.7	4.2	−27.4	−31.6
Rest of the world	83	37.4	37.4	0	55.7	55.7	0	36.9	36.9	0	23.6	26.6	1.0

1. See footnotes 1 and 2 of table 6.